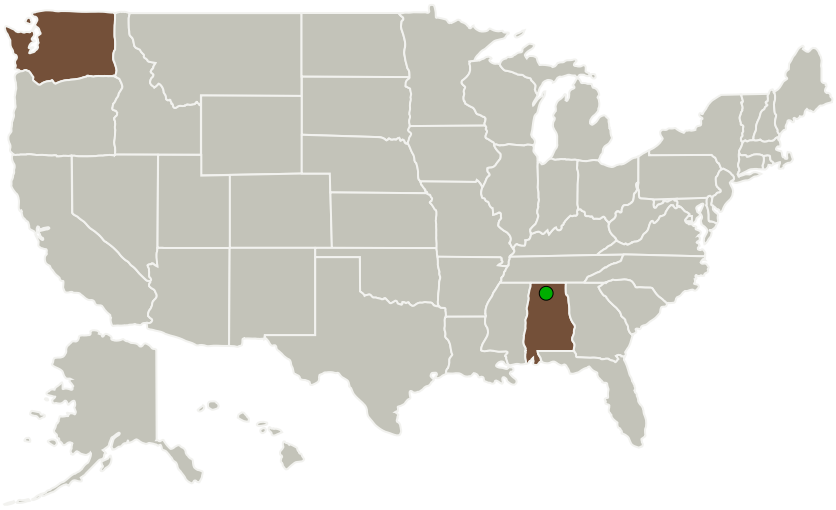
Low Cost Method of Manufacturing Space Optics, Phase II

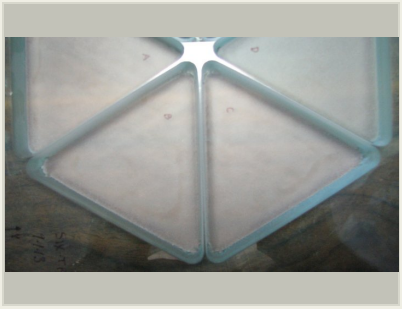
Completed Technology Project (2014 - 2016)

Project Introduction

The Phase I project successfully demonstrated the feasibility of developing a technology that will reduce cost and manufacturing time, broaden design options, and improve performance of large space optics. Primarily addressed is light weighting ULE glass mirrors for large telescope systems. While milling and cutting materials such as ULE or SiC is often performed at Ormond using a novel abrasivejet technology, there is a need to develop this technology to a the requirements of large optics manufacturing. In Phase I, Ormond proprietary glass and ceramic cutting and milling technologies were adapted to AMTD-2 requirements through software, process and tool development. The technology is now at TRL5 and technology feasibility has been demonstrated. A demonstration coupon was machined based on the current AMTD mirror concept at rates several times faster than conventional grinding can accomplish. This design has 0.75 inch deep hex cell pockets in the mirror back, the same as would exist on a full scale mirror. Rough semi-elliptical optical surface machining was also demonstrated in Schott glass. Tooling designed in the Phase II program will support substantial improvements in risk mitigation, tolerance holding capability and material removal rates. This work will continue to be performed with close interaction with NASA and Exelis to insure that the work directly supports current and future program needs. The Phase II program will result in a working system that is capable of completing a 1/3 scale model of the AMTD-2 mirror with tremendous cost savings, schedule reduction and risk reduction compared to grinding. Capacity for full scale up will be demonstrated during Phase II.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Ormond, LLC	Lead Organization	Industry	Auburn, Washington
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Washington

Project Transitions

April 2014: Project Start

April 2016: Closed out

Closeout Summary: Low Cost Method of Manufacturing Space Optics, Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/137455)*

Images

Briefing Chart Image
Low Cost Method of Manufacturing Space Optics, Phase II
(https://techport.nasa.gov/image/132399)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Ormond, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

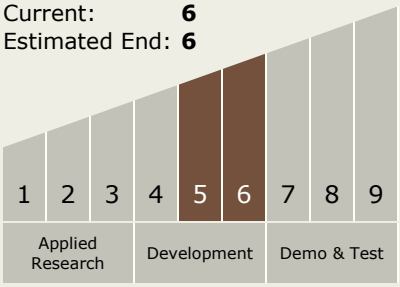
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Daniel Alberts

Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.3 Electronics and Optics Manufacturing Process

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System